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EXPERIMENTS WITH OSTRICHES—IX.

THE TERMINOLOGY OF OSTRICH FEATHERS.

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Among ostrich farmers a large number of technical names are necessary in order to describe the various kinds of feathers, as well as to indicate the many parts and "points" of the feather. Many of the names are employed somewhat loosely, and their meaning often varies in different districts; also there are many parts of the feather requiring description for which no technical names are known to the farmer. Further, as very little literature has yet been devoted to the ostrich as a recently domesticated animal, few of the terms used have ever been defined in such a manner that one can be certain of their exact meaning. The following is an attempt to give a scientific glossary or terminology of ostrich feathers, so that if accepted the names with their meanings will be fixed for further usage and prevent confusion. It is largely a combination of scientific terms, and those employed by the farmer, and while some of the former may not be necessary for ordinary purposes, they are yet introduced as helpful for those who may wish to go more deeply into ostrich matters. It is not presumed that a first attempt of this nature will be complete or accurate in all respects, and the writer will be pleased to hear from anyone to whom the terms suggest a different interpretation from that here given.

Kinds of Feathers on an Ostrich.

1.—*Contour Feathers.*—These are the feathers which occur over the body and wings, and overlap one another so as to cover and protect the skin, and assist in maintaining the high temperature of the bird (103° F.). They determine the general shape or contour of the bird, hence their name, and include practically all the feathers of the ostrich, seeing there are no down feathers such as are found in most other birds. The feathers covering the body generally are known by farmers as *body-feathers*, and are too small to be used commercially.

2.—*Feather-Tracts or Pterylae.*—Feathers do not occur all over the body of the ostrich, but are limited to definite areas which are separated by naked or featherless spaces. The former are the *feather-tracts* or *pterylae*, the latter the *featherless-tracts* or *apteria*. A large naked space or apterium occurs over the lower part of each side of the body, and extends over the under surface behind. Practically the entire leg in the adult bird is also featherless, but in the chick the outer surface of the leg above the ankle, and as far as the knee, is usually covered with feathers; these, however, disappear later, except in some birds, where a few remain over the hinder part, or calf, of the leg.*

3.—*Wing-Quills or Remiges*; *Whites and Feminas.*—The wing-quills are the largest feathers in the wing, and are arranged in a single row. They include the "Whites" in the cock, and the "Feminas" in the hen, as well as the "Byocks" or "Fancies" in the cock. The first wing-quills are attached to those bones of the wing which correspond with the first two fingers and palm of the human hand, and are known as *Primaries*; the next are attached to the forearm, or ulna, and are known as *Secondaries.* The wing-quills number about 35 on each wing, sometimes one or two more, or one or two less.

4.—*Spadonas.*—The first crop of wing-quills, grown by the chick, are known as "spadonas." They are much smaller, spear-shaped, and less valuable than the later wing-quills. The spadona is ripe when the chick is about six months old, the quill at about eight months.

5.—*Byocks or Fancies.*—These are the few wing-quills towards each end of the row, and come from the cock. They are a parti-colour of black and white, while all the other wing-quills are white.

6.—*Upper Wing-Coverts*; *Blacks and Drabs.*—The feathers above the wing-quills are also arranged in rows, and cover the lower part of the wing-quills, hence their name of coverts. They are the "Blacks" of the cock, and the "Drabs" of the hen. The feathers of the first row are the *major wing-coverts,* or "long-blacks" or "long-drabs" according as the bird is a cock or a hen; those of the second row are the *median wing-coverts,* or "medium blacks" or "medium drabs"; those of the third row are the *minor wing-coverts,* and are never taken in plucking. The blacks or drabs from the upper arm are attached to the arm-bone or humerus, and are known as *humerals*; along with the shorter black or drab coverts they constitute the "short-blacks or "short-drabs." They are not always plucked.

7.—*Lower Wing-Coverts*; *Floss.*—A single row of feathers covers the wing-quills below. They are known as the *lower wing-coverts,* or collectively as "floss," and are best seen when the wing is raised. Though long, they are very light and fluffy, and are not always plucked, but left for warmth and protection to the body when the other feathers are removed. The feathers from the under side of the arm-bone are sometimes included among the floss.

8.—*Tail-Quills or Rectrices*; *Tails.*—The stumpy tail is covered by a number of feathers which are larger and differently coloured from the body-feathers, but are smaller than the wing-quills. They are the *tail-quills* or *rectrices,* and constitute the "tails" of the farmer. The outer ones above are partly black and partly brown, and are known as "Tails, Black Butts" (B.B.). From 80 to 100 tail feathers are clipped or plucked for trade purposes.

9.—*Short Stuff.*—This is a collective term sometimes employed to include the wing-coverts, floss, and tail-quills as distinct from the wing-quills, which are then termed "long-stuff."

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*The parts of the leg in all birds are differently arranged from those in ourselves, and should be understood by ostrich farmers. The bird walks only upon its toes, and the part corresponding with the sole of the human foot is raised from the ground, and known as the tarsus or shank. It is drawn out to such a length that the ankle of the bird seems to correspond with our knee, though it bends in the opposite direction, that is, backwards instead of forwards. When an ostrich crouches halfway its toes and tarsus are on the ground, and the whole length then corresponds with the human foot. The knee of the bird is close against the body and bends forwards, and the part of the leg between the ankle and knee looks as if it corresponded with our thigh. But the true thigh of the bird is rather short, and is buried in the side of the body, and scarcely appears as a part of the leg.

10.—*Filoplumes or Hair-Feathers.*—On the skin around the wingquills and tail-quills are found a few small, insignificant down-like or hair-like feathers known as filoplumes. Feathers of this hair-like character cover the body of almost all birds, and are best seen in a duck or fowl after it has been plucked of its contour and down feathers. In the ostrich they occur only around the larger feathers of the wing and tail, and are not found in all individuals. In most birds, down feathers occur underneath the contour feathers, but these are not represented in the ostrich unless those here termed filoplumes are degenerate down.

B.—THE PARTS OF A FEATHER.

1.—*Stem or Scapus.*—This is the strong, middle supporting axis of the feather, and extends the whole length from one end to the other. The upper part or shaft bears the flue on each side, but the lower, or quill, is rounded and naked.

2. *Shaft or Rachis.*—This is the long upper part of the stem which bears the flue. It is grooved on the inner face, and rounded on the outer. The depth of the inner groove varies much. In some birds it is scarcely noticeable, and the shaft as a whole is rounded; in others it is very deep.

3. *Quill or Calamus.*—The quill is the lower, rounded, hollow, naked part of the stem which does not bear any flue. When on the bird, part of it is embedded in the feather-socket. Sometimes the term quill is wrongly used for the entire stem or scapus.

4. *Flue.*—The flue includes all the loose, soft, fluffy portion of the feather attached to each side of the shaft, and is made up of *Barbs* and *Barbules.* The flue in the ostrich corresponds with the *web* in ordinary compact feathers such as those of the fowl or duck. In these birds the parts of the flue are bound together by minute hooklets or barbicels on the

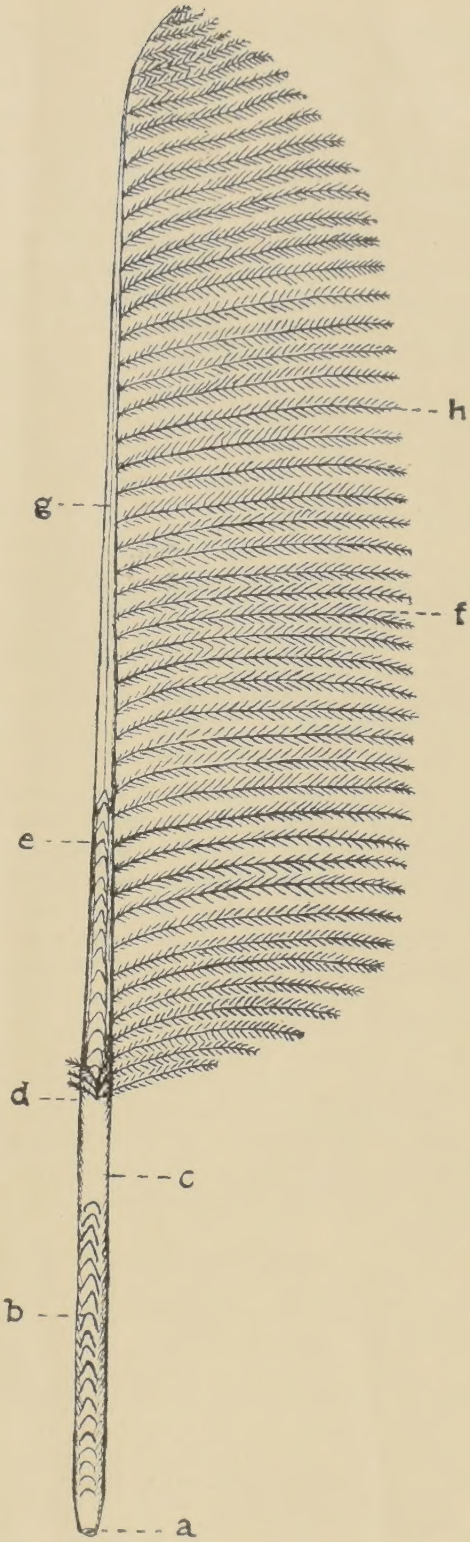

Fig. 1.—Diagram to illustrate the parts of a feather, the flue being represented on only one side. The pith sheath with the feather cones inside is shown extending a short distance up the shaft, having been preened away above. *a*, lower umbilicus; *b*, feather cone; *c*, quill; *d*, upper umbilicus; *e*, sheath of pith with feather cones; *f*, barbule; *g*, shaft or rachis; *h*, barb.

barbules; but these do not occur in the ostrich, hence the looseness of the flue.

4a. *Double-Floss.*—The name "double-floss" applied to some feathers should really be "double-flue." In these the barbs come off so closely from the shaft that they alternate with one another instead of being in a single row down each side; this gives a double appearance to the flue, and signifies great density, which is much desired.

5. *Barbs.*—These are the separate parts of the flue which are directly connected with the shaft, and extend from it either horizontally or obliquely upwards. According to their strength they determine whether the flue is "self-supporting" or not.

6. *Barbules.*—The barbules are the short, fine, delicate parts of the flue which arise from each side of the barbs, from which they are split off just as the barbs are split off from the shaft. The barbules vary much in length in the different qualities of feathers and greatly determine the density. By some farmers the term *flue* seems to be used so as to include only the barbules and not the barbs, and by others to mean only the barbs.

7. *Plume.*—It is recommended that the term plume be restricted so as to mean only the part of the feather above the quill, that is, the part of the feather which is clipped, the quill being the part remaining behind to be drawn when ripe. In practice a short portion of the quill is clipped along with the plume so as to enable the plumes to be handled and tied together without damaging the flue. Thus restricted a plume would include the shaft and the flue, but not the quill; *feather* would include the whole, that is, both plume and quill.

8. *Pith or Medulla.*—This is the soft central part of a "green" feather in which flows the blood which nourishes the growing feather. If a plume is cut "green," the pith can often be drawn out of it as a soft, narrow, worm-like thread, red with the blood, while severe bleeding or hæmorrhage takes place from the end of the part remaining in the socket. As the feather grows the blood slowly recedes downwards and completely disappears, and then the pith dries up and the space it occupied becomes filled with air. As the feather expands a horny sheath which surrounded the pith is to be seen on the inner or grooved side of the shaft enclosing a number of thin horny cones fitting over one another and often containing dried blood. This horny pith sheath extends the whole length of the plume, but is preened away by the bird as the feather opens out in the course of its growth. Within the transparent ripe quill shorter "feather-cones" can be seen. The cones are the partitions which successively cut off the nutritive blood from above as the feather grows in length and matures.

It is of some importance to know that the red blood never leaves the pith or medulla to pass to the feather substance proper; so that the feather itself never has any blood in it, but only surrounds the blood flowing in the medulla. Only the colourless liquid part of the blood, the blood-plasma, exudes through the sheath of the pith and nourishes the growing feather. The nerves and blood-vessels are restricted to the medulla, which is really a part of the under skin prolonged into the feather and carrying blood-vessels and nerves. The feather having neither nerves nor blood-vessels there is no pain nor bleeding when the pipe feather is clipped, anymore than when our own hair is cut.

9. *Superior or Upper Umbilicus.*—The upper umbilicus is a small aperture in the feather on the inner side where the plume and the quill meet. It represents the place at which the pith or medulla emerges from the quill to pass up the shaft.

10. *Inferior or Lower Umbilicus.*—This is the circular opening at the tip of the fully ripe quill, and represents the aperture through which the pith with the blood-vessels and nerves entered the feather from the skin; or rather the aperture through which the pith receded from the feather as the quill ripened.

11. *Feather-sheath.*—The growing feather before it opens out is surrounded by a thin, horny, delicate covering which is the feather-sheath. As the feather ripens and dries the sheath cracks and is preened away by the bird with its beak, and, as removed, the flue is liberated and expands. The middle horny covering or sheath of the pith is also preened away at the same time. For some reason a bird will sometimes neglect to preen away the feather sheath, and the feather then grows upwards as a solid rod, perhaps expanded a little at the tip.

12. *Feather-socket or Feather-Follicle.*—This is the deep pit or hole in the skin occupied by the lower part of the quill, and is best seen when the quill is drawn. At the bottom of it is the *feather-germ* which gives rise to the new feather. When a feather is plucked, either ripe or unripe, the germ below at once commences to form a new feather. If the quills are drawn during very cold weather it appears as if the feather-germ sometimes suffers from the exposure, resulting in future "blanks" from some of the sockets; also if a bird is in low condition at quilling blanks may occur, owing to the inactivity of the feather-germ.

All the feather-sockets which the ostrich will possess are already present in the chick, so that the number of feathers does not increase with the growth and age of the bird.

13. *Socket or Follicle-sheath.*—Sometimes in drawing the spadona quills a thin delicate horny membrane is also pulled out. This is the sheath which lines the socket, and the pulling of it out does not prevent the formation of the next feather from the same socket as some farmers suppose.

14. *Tip and Butt.*—The tip of the feather is the end away from the quill; the butt is the end next the quill.

C. THE PLUMAGE OF THE OSTRICH.

By the plumage of the ostrich is understood the entire covering of feathers on the bird at any one time. The covering is not the same at all periods, for the bird varies greatly in appearance between its chick and adult condition, dependent upon differences in the colour and other characters of its feathers. Four well-marked plumages can be distinguished in the ostrich, namely, the *Natal*, the *Chick*, the *Juvenal*, and the *Adult*. These represent four distinct kinds of feathers which each feather-socket on the bird can produce, but, as regards the bird as a whole, the passage from one stage to the other is gradual, as there is no well-defined moulting period in the ostrich. Until the adult plumage is reached, there is an intermingling or overlapping of the feathers belonging to different plumages.

The characteristics of each plumage will be only briefly described.

1. *The Natal or Birth Plumage* (Fig. 2).—Like the young of many other birds the ostrich chick when hatched is provided with feathers in the form of down. This is the natal or birth plumage. The feathers consist of small tufts of rather stiff rays or barbs, differing in length, and all starting from about the same level, there being no central shaft and no quill as in later feathers. Some of the barbs of each down feather are prolonged into a rather coarse, curled, strap-like part, and gives a bristly, almost hedgehog-like appearance to the young chick.

The down feathers of the back and sides vary in colour from light to dark brown or nearly black, and the different colours being intermingled, give a characteristic mottled appearance to the chick, the black being arranged in stripes and patches along the neck and head.

The natal feathers are not moulted in the ordinary manner of later feathers. A week or two after hatching they begin to be pushed out of the feather sockets by the chick feathers growing below, the first to be pushed being the down feathers along the sides of the hinder part of the body. Being very light, the down does not break off from the tip of the chick feather, but remains continuous until worn off.

2. *The Chick Plumage* (Fig. 3).—The chick plumage is that which begins to appear soon after the chick is hatched, and is completed at the age of about eight months, that is, when the wing-quills (spadonas) are fully ripe. The chick feathers are distinguished by bearing at their tip the natal down, and the plumage as a whole is mottled in character. The mottling, however, is not due to the intermingling of light and dark feathers, but to the fact that the upper part of each feather is light brown, while the lower part is of a dark grey colour; all the chick feathers also taper towards their tip in a spear-like manner, hence their name of *spadona*.

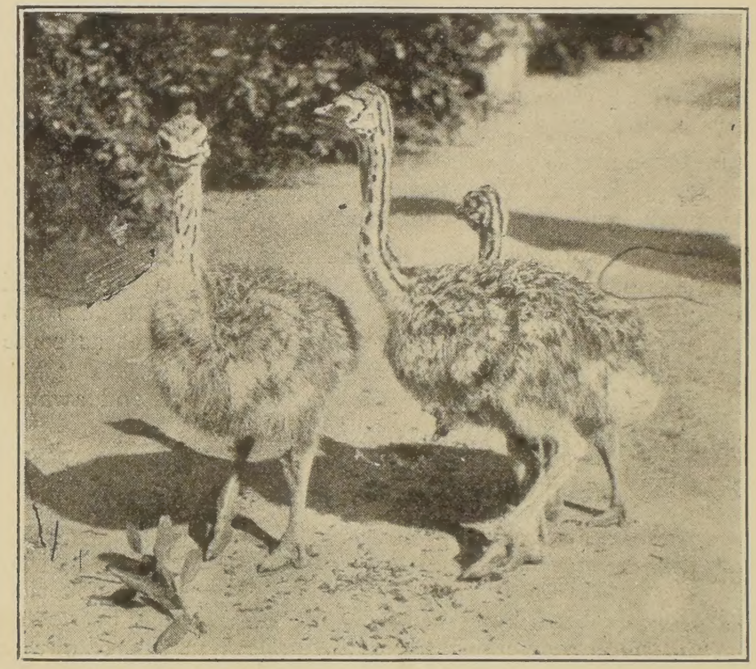

Fig. 2.—Ostrich Chicks showing natal or birth plumage. The down feathers are hairy or bristly, light and dark patches being intermingled; on the head and neck the dark feathers are arranged in bands or patches. At this stage, about one month, the chick feathers are beginning to push out the natal down.

The various kinds of feathers—body feathers, neck and head feathers, coverts, and wing-quills and tail-quills—now for the first time show those differences which are such a marked feature of the adult. Among the feathers of the chick plumage there is little or no sexual difference, nothing to indicate which are cocks or hens. To determine this, however, other characters are available.

3. *The Juvenal Plumage.*—The third or juvenal plumage does not follow immediately upon the second or chick plumage, as the moulting is never uniform over all the body. The body feathers of the chick are pushed out gradually, one at a time, from four or five months onwards, and are replaced by larger juvenal feathers of an altogether different type. Instead of being mottled, the new feathers are of a uniformly dark grey or slate colour, and the tip is rounded, not pointed.

The chick as a whole begins to lose its mottled appearance from eight or nine months onwards. This is partly due to the replacement of the lighter tipped chick-feathers by others of a uniform hue, and partly to the fading and wearing away of the light tip of the old ones remaining. By the time the young birds are a year old nearly all the body-feathers show the drab colour of the juvenal plumage, those of the cocks being a little darker than those of the hens. All the feathers of the juvenal plumage are not fully ripe until the birds are about sixteen months old, the last to ripen being the wing-quills, which are known as "first-after-chicks," or, better, as *juvenals.*

4. *The Adult Plumage.*—The adult plumage in the cock ostrich is altogether different from that of the hen. The full distinction is reached when the birds are about two years old, but great variation is met with, some strains completing their plumage much before others. The adult cock is characterised by the possession of black body-feathers and coverts, the hen by drab body-feathers and coverts. The difference may perhaps better be appreciated by saying that the hen retains the same grey colours which she had in the juvenal plumage, while the cock passes through this to a further stage, where the feathers are black. Both are practically alike in colour as far as the juvenal plumage, and the hen retains this throughout life, while the cock goes a stage beyond.

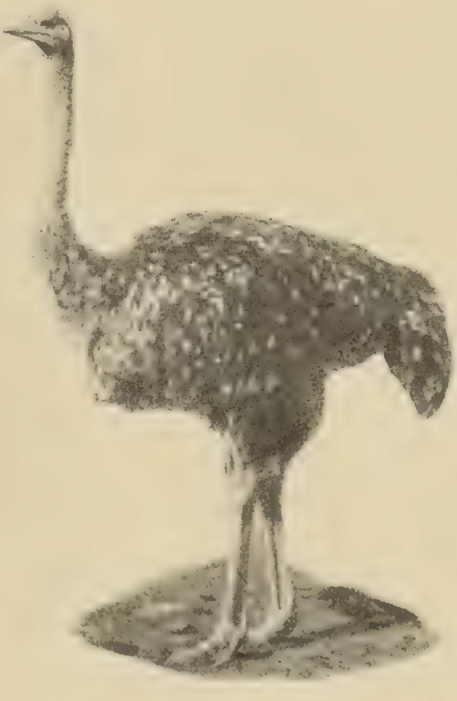

Fig. 3.—Chick Ostrich, about five months old, showing the chick plumage. Each feather is spear shaped, light brown towards the tips and dark grey below, thus producing a mottled effect.

With the fourth plumage, "second-after-chicks," the valuable wingquills of both the cock and the hen have reached their full size and show their best characteristics. The third and fourth clippings are generally considered to represent the best efforts of the ostrich in the direction of feather production, but with the high feeding now largely followed the juvenal feathers or first-after-chicks show almost mature characteristics.

With proper usage an adult ostrich will continue to give feathers of practically the same quality for many years; instances are known of birds thirty-five years old or more which still produce good plumes. With careless usage, especially in the matter of quilling, the character of the plumes rapidly deteriorates.

D. FEATHER OPERATIONS.

1. *Plucking.*—Plucking is the term used when the feather as a whole, that is, both plume and quill, is taken from the socket. Farming practice varies much as regards the extent to which plucking is carried out. Some farmers pluck all the short stuff, that is, tails, blacks, and drabs, while others clip them.

2. *Clipping.*—This is the term employed when the plumes and a short portion of the quills are clipped, leaving the remainder of the quill in the socket to ripen. Clipping is adopted instead of plucking in order to secure the plumes as soon as they are fully formed or ripe, and thereby prevent the deterioration which takes place if they are allowed to remain on the bird until the quill is fully ripe. The wing-quills, both whites and feminas, are always clipped, while practice varies as regards the short stuff, this being either clipped or plucked.

3. *Quilling or Stumping.*—This is the process of drawing the ripe quills or stumps from which the plumes have been previously clipped. The process of ripening the quills after clipping usually takes about two months. The new crop commences to form immediately after quilling, the feathers showing at the lip of the socket in about a month's time.

4. *Sorting.*—In preparing the feathers for sale the various kinds and qualities of feathers of each bird are separately sorted and tied in bundles according to the sorts given under "Trade Classification of Feathers."

E. THE COMMERCIAL CHARACTERS OF A FEATHER.—"POINTS."

Ostrich Feathers differ greatly in appearance and value according to the possession of various characters. In any feather an expert can determine these at a glance, and can readily arrange the different classes in their relative values for trade purposes. In careful judging of plumes, particularly for Stud-Book purposes, different values or percentages are assigned for these qualities, or "Points" as they are termed. The various characters determine the commercial value of a feather, and are those which the breeder endeavours to secure. They can be analysed as follows:—

1. *Length.*—Other characters being equal, a feather is valuable in proportion to its length. For some purposes, as for making feather-fans, a short compact plume is needed; but, in general, a feather increases greatly in value according as it increases in length, assuming that the other points remain equally good. The length of a plume is necessarily determined by the length of the shaft or rachis, the length of the quill not being taken into consideration.

2. *Breadth.*—In a similar manner a feather is more valuable the broader it is across, other characters again being equally good. Length and breadth combine to make a large feather, and the largest feathers command the highest prices, though, of course, the demand for long or short feathers varies somewhat with fashion. In the manufacture of feathers it is possible to construct a feather of any length by adding others to it, but there is no such means of increasing the breadth. The length of the barbs is the factor which determines the width of a feather, and also the angle at which they come off from the shaft. In the best feathers the barbs come off almost at right angles, while in inferior plumes they are inclined upwards and towards the axis. No constant correlation seems to occur between the length of a feather and its breadth, and often very long feathers are of little value by being narrow and stalky. The two sides should be of equal breadth, and a slight depreciation occurs where one side is narrower than the other.

3. *Density or Compactness of Flue.*—Among a number of feathers great variation is to be seen in the density of the flue, some being very thin or open, while others are very dense or compact. Other characters being equal, a dense, compact feather is much more valuable than a thin one. The density of the flue depends upon three factors: (1) closeness of the barbs, (2) closeness of the barbules, (3) the length of the barbules. The first two are correlated with one another, that is, the closer are the barbs on the shaft, the closer are the barbules on the barbs. One can readily see that the barbs are split off from the shaft much nearer together in some feathers than in others, and similarly with the barbules from the barbs. In most feathers the barbs come off all in the same vertical plane, but in some they come off so closely as to arrange themselves in an alternate manner down each side of the shaft, and thereby give the flue the appearance of being double; hence the term "double flue," or its misnomer "double-floss," sometimes applied to such feathers, these being among the most valuable on account of their density. The length of the barbule is also an important character in determining the value of a feather, as the density or compactness of the flue is largely determined by it. At the present time length of barbule is probably more sought after by breeders than any other single feature, as without it no marked degree of density can be attained.

The compactness of the flue should be equal throughout, that is, not more open or denser in some places than in others. The regularity produces a great difference in the appearance of natural feathers, and is partly determined by the manner in which the plumes overlap one another in the process of growth.

4. *Strength or Self-support of Flue: "Hard" and "Woolly" Flue.*—The strength of the flue, by which is really meant the strength or stiffness of the individual barb, is a matter of great importance in estimating the value of a feather. Sometimes the flue of a feather will hang down from the shaft in a loose, pliant manner, the barbs having no self-support; in others each barb will stand out at right angles from the shaft almost to its extreme tip. Such a feather is said to have a "selft-supporting" flue, and, in general, the stronger, more self-supporting is the flue, the more valuable is the feather from the manufacturer's point of view. In the best feathers, as already noted, the barbs come off practically at right angles from the shaft, and extend horizontally their entire length, thereby denoting great strength; in poor feathers the barbs come off at an angle from the shaft and extend upwards instead of horizontally, or, being very weak, hang downwards in a limp manner. It is manifest that a barb extending horizontally from the shaft gives full value to the width of the plume, which is not the case where the barbs extend upwards or droop downwards. Independently of this feathers in which the barbs point upwards instead of outwards are often narrow and of little value. In such plumes the flue as a whole is strong, but stiff and coarse. The term "woolly" is usually applied to a feather in which the flue is soft and non-supporting, and the term "hard" to one in which the flue is self-supporting and firm. For manufacturing and dyeing purposes a hard feather is greatly preferred to a woolly one.

5. *Quality and Lustre.*—Some feathers are quite harsh and coarse to handle, and are dull in appearance, while others are silky to the feel, and have a distinct gloss or lustre. The latter characters are those most desirable, and are generally found in the plumes of birds which are well fed and in good condition. Silkiness, gloss, and lustre are sometimes combined with a soft woolly flue which is very undesirable; the object aimed at is to combine strength of flue with quality and lustre. The feathers of wild birds are often very strong, but lacking in flexibility and lustre,

these being added by artificial feeding and care. Ostrich feathers are usually most lustrous when the plume is fully ripe; if allowed to remain longer on the bird they tend to become dull and worn in appearance, and the drabs and black become bronzed. Climatic conditions and elevation appear to have a considerable influence upon the lustre of the feather.

Texture and lustre seem to be the characteristics combined under the trade term "quality."

6. *Shape.*—In addition to size, which is dependent upon length and breadth, the actual shape or outline of a feather is a matter of much concern in the determination of its value. The following are the principal characters which are to be considered in this connection:—1. *The equality of the two sides.*—Although ostrich feathers are usually considered to have the flue of equal width on the two sides, and as such have been used as symbolical of the equity of justice, marked differences between the two halves are often apparent. Where the inequality is at all conspicuous the feather is depreciated in value thereby. Frequently if the flue is narrow on one side it is proportionately broad on the other, as if not divided equally in the course of its development. 2. *Parallelism of the sides.*—The margins of both sides should be as nearly as possible parallel throughout, not tapering for a great length towards each end. Some of the finest feathers show this parallelism to a marked degree, while in others the sides are inclined towards each other for a long distance at both ends, though more especially towards the quill end. The more nearly square is the flue at both ends, that is, the less tapering either way, the greater is its value. The inturning of the sides and bending over of the tip, though adding much to the beauty of a feather, are not of importance in the natural undressed feather, as in the process of manufacturing they can be easily produced from a flat feather. 3. *Equal length of Barbs.*—In some feathers great differences occur in the length of the individual barbs. Some may be quite short and mingled with others which are long and tapering, thereby giving a straggling appearance to the sides of the feather as a whole. The barbs should be as nearly as possible of equal length, and blunt or truncate at the free end, not with the barbules tapering to a point. 4. *Weighty tip.*—The tip of some feathers is long and tapering, while in others it is blunt or truncate and the flue as a whole much denser, thereby giving a full, compact, heavy appearance which is much prized.

7. *The Shaft.*—The central shaft or axle of the plume shows much variation of a desirable or undesirable nature from a trade point of view. It should be as narrow as possible, and yet strong and sufficiently flexible to permit of a graceful curve to the feather as a whole, more especially towards the tip. A thick shaft, whether dense or light, gives an undesirable coarseness to a feather compared with one which is narrow yet strong and flexible. The axis in some plumes is nearly circular in section, while others show a deep inner groove indicating where the two halves are fused; the groove often harbours parasitic mites.

The shaft forms a considerable proportion of the total weight of the feather, and, as farmer's feathers are sold by weight, it is manifest that a heavy or light shaft may make a great difference in the value of a plucking; the farmer, as seller, prefers a heavy shaft, while the buyer encourages a light one, and thereby secures a larger number of feathers per pound. But in careful buying, the necessary allowance is made for a light or heavy axis.

8. *Freedom from Bars.*—The defects technically known as bars constitute a break in the regularity of the growth of the plume, and extend more or less completely across the flue. Their presence in a feather, if

at all pronounced, results in a serious depreciation of its value, partly on account of their constituting so many points of weakness in the feather and also from their interference with the regularity of its flue. The defects may be limited to the flue, but usually indents the shaft also. Other imperfections are generally associated with the barring defects, as the latter are usually connected with a lowered nutritive condition on the part of the feather.

9. *Summary.*—The different characters as found in the most valuable feathers may be summarised as follows:—The plume should be as long and as broad as possible; the flue should be dense, compact, and even, the barbs and barbules crowded, the former coming off at right angles from the shaft and extending horizontally, the latter long; both shaft and barbs should be strong and flexible, but not thick and coarse, the barbs self-supporting; the sides of the flue should be equal and the margins parallel, not tapering towards either the tip or the butt end, and the barbs at any part should be of equal length and blunted, not tapering; the whole plume should be lustrous and glossy to the feel, not dull, dry, and harsh; lastly, it should be free from barring and other defects. Practically all these points can be condensed in the remark that the plumes should contain as much feather material as possible and symmetrically arranged. Trade requirements necessarily determine what the farmer should try to produce, and the above indicates these requirements. As in every other technical subject expertness in judging all the merits of a feather can only be attained by long experience.

F.—TRADE CLASSIFICATION OF OSTRICH FEATHERS.

Ostrich feathers are sold by weight, either by auction or out-of-hand, at a certain price per pound. When being disposed of by auction at the regular sales they are classified as under:—

1. *Whites.*—These include nearly all the wing-quills of the cock bird, both primaries and secondaries, and number about 24 from each wing. They are the most valuable of all the feathers, and are pure white, any admixture of black or grey placing them in a different class. According to quality they are classed as *primes* or *supers*, *firsts*, *seconds*, *thirds*, *stalky* and *inferior*.

2. *Feminas.*—These are the wing-quills of the hen bird which correspond with the whites of the cock. They are distinguished by having more or less black pigment which gives a greyish appearance, sometimes only very faint, but enough to show their true nature. They are classed according to the amount of pigment as *tipped*, *light* or *dark*, and are graded as *supers*, *firsts*, *seconds*, *thirds*, *stalky* and *inferior*.

3. *Fancies or Byocks.*—Towards each extremity of the wing in the cock, the white wing quills pass gradually into the black feathers, and four or five feathers at each end are a parti-colour of black and white. They are generally very attractive plumes, and are known as fancies or byocks, and classed as *long* and *short*.

4. *Blacks.*—These include the first and second rows of wing coverts of the cock, and also the feathers sometimes plucked from the upper borders of the humerus. According to their length they are arranged as *long*, *medium*, and *short*. If, as is sometimes the case, the blacks show much admixture of white, they are placed among the fancies.

5. *Drabs.*—These are the corresponding covert rows in the hen, and are always greyish, not black. They are classed as *long*, *medium*, and *short*.

6. *Floss.*—The feathers constituting the single row of under coverts are more delicate in texture than the others, and are technically known as floss, *black floss* from the cock and *drab floss* from the hen; the feathers

from the lower border of the humerus also belong to this class. They are classed as *long*, *medium*, and *short*.

7. *Tails or Boos.*—These are the tail quills, being white, or white and brown in the cock, and light or dark in the hen. They are classified as *white*, *brown*, *light* and *coloured*, or *dark*. The feathers intermediate between the tails and tail coverts are known as *Tails*, *Black Butts* (B.B.).

8. *Spadonas.*—The first or chick wing-quills, clipped at about six months, are much smaller and more tapering than those produced later, and receive the special name of spadonas. They are of much the same character from both cock and hen chicks, and are arranged as *white*, *coloured*, or *dark*.

9. *Chick.*—These are the coverts and tails from the chick, and are of little value.

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